Chapter 3:

Q#63

Solution:

$A\ (0,8,z)$

$B\ (-5,0,4)$

$C\ (5,0,4)$

$Fj\hat{}=\mathrm{F}-$

$\hat{}\,W=-200k\hat{}$

$T_{AB}=50089+(4-z)2-5i\hat{}-8j\hat{}+(4-z)k\hat{}$

$$T_{AC}=\frac{5i-4j+(8-z)k}{\sqrt{89+(4-z)2}}$$

$$\sum F_Z=0$$

$$1000*\frac{4-z}{\sqrt[2]{89+(4-z)^2}}=200$$

$$5*(z-4)=\sqrt[2]{89+(4-z)^2}$$

Z=2.07 ft or z=5.93 ft

$$F=\frac{8000}{\sqrt[2]{89+(4-2.07)^2}}=831\ \text{lb}$$

Hence

z=2.07 ft and F=831 lb

Q # 68:

Finding the weight of blocks:

$W_A = W_B = W_C$

*W=m*a*

*=2*9.8*

W=19.62 N

$W_{E=¿¿}$ *3*9.8*

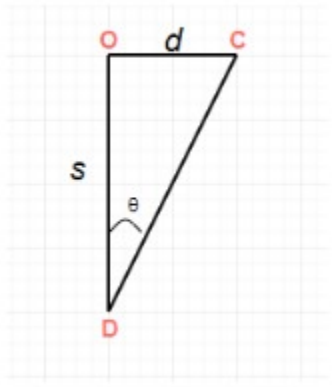
=29.43 N

$W_{A=¿¿}$ T_A

$W_{B=¿¿}$ T_B

$W_{C=¿¿}$ T_C

Triangle created by one cord.



Using Equilibrium equations along z-axis

Ta +Tb +Tc- $W_E = 0$

19.62 N * (cosθ) +19.62 N * (cosθ) +19.62 N * (cosθ)-29.43=0

$\cos\theta = \frac{29.43\,N}{58.86\,N}$

θ = 60^°

$d = \frac{0.5}{\cos 30°}$

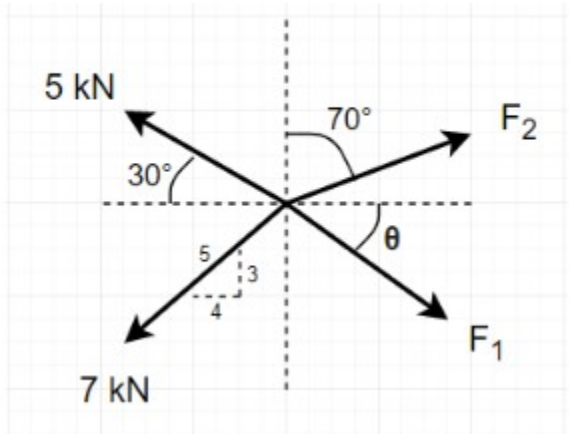
d = 0.58 m

$s = \frac{0.58}{\tan 60°}$

s= 0.33 m (ANSWER)

Question # 72:

Free Body Diagram of Joint O



As we have two unknowns, we can solve it using two summation of forces

$\sum F_x$ =0

-5 kN*(cos 30°) – 7 kN($\frac{4}{5}$¿ + F1* (cos 60°) + F2*(sin 70°¿=0

$F1 = \frac{9.93\,kN - F2*(\sin 70)}{\cos 60}$

$\sum F_y = 0$

5 kN*(sin 30°)- 7kN*(3/5¿ –F1*(sin 60°)+F2 *(cos 70°¿=0

$$F_1 = \frac{F2 * (\cos 70\ °) - 1.7\ kN}{\sin 60\ °}$$

Insert F1 from equation 1 to 2

$$\frac{F2 * (\cos 70\ °) - 1.7\ kN}{\sin 60\ °} = \frac{9.93\ kN - F2 * (\sin 70)}{\cos 60}$$

F2 =9.60 kN , Tension

$$F_1 = \frac{9.60 * (\cos 70\ °) - 1.7\ kN}{\sin 60\ °}$$

F_1 = 1.83 kN, Tension